

CASE REPORT

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Use of autologous fat grafting for the correction of burn scar contracture in the hand: a case report

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ABSTRACT

Severe burn injuries to the hand represent a topic of great concern due to long-term complications such as hypertrophic burn scar and contracture, which may result in loss of function. We present a case of burn scar contracture in the hand of a child undergoing Z-plasty and lipofilling.

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Lipofilling; burns; cicatrix; contracture; hand

Introduction

The treatment of severe burn injuries to the hand represents a topic of great concern. The development of long-term complications such as hypertrophic burn scar and contracture may result in altered appearance and potential loss of function in addition to an adverse impact on quality of life [1,2]. Thus far, it has been difficult to improve skin quality and soften scar tissue after burns. Autologous fat grafting is a method that may serve as a supplement to existing surgical treatment with possible regenerative effects on the treated area and may prevent contracture and adherence [3–5].

We present a case of burn scar contracture in the hand of a child undergoing a combination of Z-plasty and lipofilling.

Case report

A 7-year-old girl presented with scar contracture to the palm of her left hand due to a deep partial-thickness burn injury acquired 6 years ago. She had undergone wound debridement and split-thickness skin grafting within 3 weeks after the injury. She complained of tension in the scar limiting the motion of her left thumb and thereby the ability to participate in physical activities at school. Physical examination in the outpatient department revealed a tight, adherent

and thick seal of scar tissue across the proximal part of the left palm and decreased extension of the thumb. A Z-plasty was performed to release the burn scar contracture combined with lipofilling to improve the skin quality and prevent adhesions between scar tissue and tendons. The inner thighs were used as donor sites, and after injection of Klein's solution a total of 5 ml of fat graft was transferred. Postoperatively, the patient was treated prophylactically with dicloxacillin 250 mg, orally, three times a day for a week. The scar was not treated with occupational, massage or pressure garment therapy prior to or after the surgery. The patient made a full recovery despite minor delayed healing due to a complication of the Z-plasty. The patient developed necrosis at the flap tips of the Z-plasty, which was treated successfully in a conservative manner. At 1-year follow-up, the post-burn scar had become soft and pliable with a full range of motion in the thumb and an intact neurovascular status (see Figure 1). The donor site healed without complications.

Discussion

Currently, the treatment for long-term burn outcomes, hypertrophic scar and contracture, includes a variety of non-surgical therapies such as mechanical compression dressing, silicon sheet application, steroid injection, cryotherapy and laser therapy. These methods are

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Figure 1. (A) Scar contracture to the palm of the hand preoperatively. (B) Perioperatively. (C) 5 weeks postoperatively with the necrosis at the flap tips. (D) 12 months postoperatively.

often used as a first line of choice or in combination with surgery. Surgical scar revision involves tissue expansion, serial partial excision, skin grafting, Z-plasty and related tissue rearrangement techniques. In cases of a contracting scar with an obvious scar band and impairment of function, Z-plasty, or multiple Z-plasties in a large scar, may be a simple and effective technique for contracture resolution by lengthening the scar and redistributing the tension in the scar. Z-plasty and locoregional flaps provide better recovery and a lower contracture recurrence rate compared to skin grafting, whereas split-thickness skin grafting is preferred for covering large burn areas due to its availability [6–9]. However, none of the abovementioned treatments appear effective in terms of achieving good skin regeneration [2,7,10]. Over the last two decades, several studies have shown the beneficial effects of autologous fat grafting on scar contracture and skin

quality [11,12]. A study including 18 patients with postburn hypertrophic scars and keloids, who underwent three procedures of fat grafting with a 3-month interval between sessions, found clinically an improved softness, texture, thickness, elasticity and colour of the treated skin as well as a reduction of the scar retraction [3]. A series of three patients with hemifacial burn scars, who underwent two sessions of fat grafting with a 3-month interval, observed at 6-month follow-up, showed a considerable improvement in the skin texture, thickness, softness, elasticity and mimic features [4]. A recent study including 40 patients, the majority with adherent postburn scars and previous split-thickness skin grafting, found a significant increase in pliability at 3-month follow-up, measured by the Patient and Observer Scar Assessment Scale and the Cutometer following a single fat grafting procedure. Scar features were ameliorated and the patients

reported a significant decrease in pain related to the scar [13]. Histologically, autologous fat grafting has been found to regenerate the dermis and subcutaneous tissue with an increased fat layer, local neoangiogenesis and new collagen deposition. The areas with burn scar regain characteristics similar to normal skin, even in severe old burn cases, both functionally and aesthetically [5].

This case demonstrates that a combination of scar tissue release techniques and fat transfer can be an effective and suitable treatment for burn scars in areas requiring good sensitivity and movement to maintain normal function and prevent the recurrence of adherence.

Disclosure statement

The authors report no conflicts of interest.

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